CE

Telair

GENERATORS

ENERGY 2500 GAS

USE AND MAINTENANCE MANUAL AND INSTRUCTIONS FOR INSTALLATION

GB

v. 022 December 2008

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Via E. Majorana , 49 48022 Lugo (RA) ITALY

"CE" COMPLIANCE STATEMENT

Under Machine Directive 89/392/EEC, attachment II A

We hereby represent that the generating set - the data concerning which are specified below - has been designed and built to correspond to the essential safety and health requirements laid down by the European Directive on Machine Safety.

This statement shall no longer be valid if any changes are introduced in the machine without our written approval.

Machine: GENERATOR-SET

Model: ENERGY 2500 G

Serial number: ……...

Reference Directive:

Machine Directive (89/392/EEC) version 91/31/EEC

Low Voltage Directive (73/23/EEC)

Electro-magnetic Compatibility (89/336/EEC) version 93/31/EEC

Harmonised standards applied, in particular: EN 292-1; EN 292-2; EN 60204-1

DATE .....18/12/2008.....

THE PRESIDENT

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1 FOREWORD

MANUAL ***Refer carefully to this manual before performing any operation on the power generator set.***

1.1 Purpose and scope of this manual

This manual has been drawn up by the Manufacturer in order to provide basic information and instructions for performing every operation for servicing and using the generating set in a proper and safe manner.
It is an integral part of the generating set equipment, must be kept with care throughout the life of the same, and must be protected against any agent which could damage it.
It must follow the generating set if this is installed on a new vehicle, or if its ownership changes hands.
The information in this manual is addressed to the personnel in charge of installing the generating set, and to all those involved in its maintenance and use.
This manual sets out the purpose the machine was designed for, and contains all the information required to guarantee that it is used in a safe and proper manner.
Constant compliance with the instructions laid down here will guarantee the safety of the user, operating economy and longer life of the machine.
To facilitate reference, this manual has been subdivided into chapters specifying the main notions contained therein; for quick consultation, refer to the table of contents.
The most important parts of the text are in bold letters and preceded by symbols described here below.
It is strongly recommended that you read the contents of this manual and the reference documents carefully; doing so is essential to the correct long-term performance and reliability of the generator set and the prevention of injury and/or damage.

Note: *The information contained in this publication was correct at the time it went to print, but may be modified without advance notice.*

1.2 Symbols and Definitions

"Graphic safety symbols" have been employed in this booklet to identify different levels of danger or important information.

DANGER This means that you must pay attention to avoid serious consequences which might lead to serious accidents or damage the health of the operators.

WARNING This means a potentially hazardous situation which could lead to accidents or damage to property.

INFORMATION This calls the user's attention to a potentially dangerous situation which could cause malfunction or damage the machine.

The drawings are only provided by way of example.
Even though the machine you actually have may differ from the illustrations contained in this manual, safety and information about the same are guaranteed.
The manufacturer, as part of his policy of constant product development and updating, may introduce changes without giving any notice.

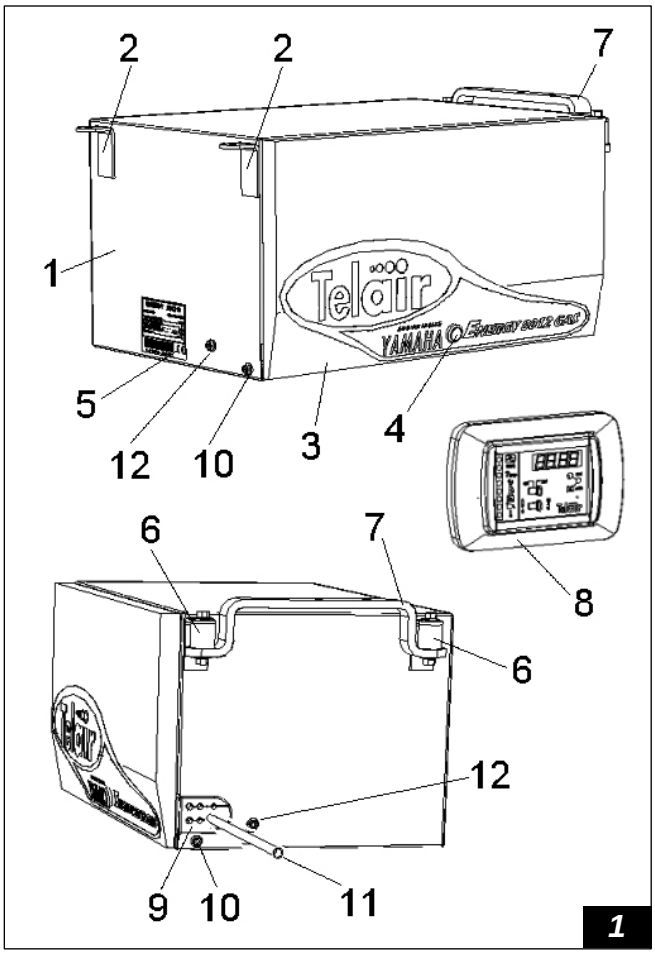
1.3 General Information

The ***ENERGY*** generating set has been designed for installation on vehicles. It can deliver power at a voltage of 230 VAC 50 Hz.
The ***ENERGY 2500 G*** model must be fed with LPG.
In order to achieve a low noise level, the ***ENERGY*** series generating sets are provided with internally insulated sound-proofing cases.
They can be accessed easily in order to perform maintenance work, and are provided with a remote control panel which can be installed inside the vehicle.
The generating sets can be connected to the tank of the vehicle as long as the fuel type is compatible. Otherwise, install a special tank which can be supplied as an option.

2 GENERATING SET IDENTIFICATION DATA

2.1 Components (Fig. 1)

1 Sound-proofing casing
2 Supporting brackets
3 Access door
4 Access door closure
5 Technical features sticker
6 Anti-vibration support
7 Anchoring bracket
8 Electronic control panel
9 Gas pipe and cable outlet block
10 Sliding surface locking screw
11 Supply gas arrival pipe
12 Sliding surface all out locking screw



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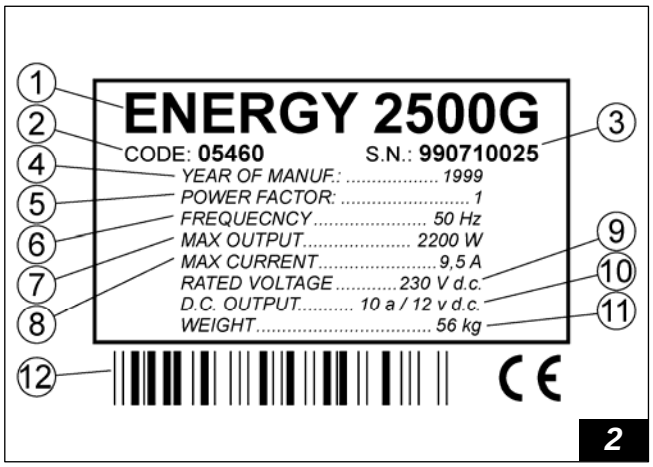
2.2 Identification plate (Fig. 2)

1 Generating set model
2 Model code number
3 Serial number
4 Date of manufacture
5 Power factor
6 Frequency
7 Maximum electric power
8 Maximum current
9 Rated voltage 230V AC
10 Current delivered at 12V/DC
11 Weight
12 Bar code



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2.3 Overall dimensions

Figure 3 shows the dimensions of the generating sets.

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2.4 Technical specifications

		ENERGY
ENGINE		**2500 G**
Type		Single cylinder, 4 stroke LPG, overhead valves, air cooling
Engine		Yamaha MZ 175 GAS
Displacement	cm^3	171
Bore x Stroke	mm	66 x 50
Max Fuel Consumption	kg/h	0.8
Fuel supply		LPG
Ignition system		Electronic
Spark plug		BPR4ES
Oil sump capacity	litres	0.6
Speed governor		Automatic with centrifugal weights
ALTERNATOR		**2500 G**
Type		Synchronous, single phase, self-adjusting, two poles, brushless
Max power	kW	2.2
Continuous power	kW	2
Voltage/ Frequency	V/Hz	230 / 50
Continuous current output	A / Vdc	10 / 12
Rotor insulation class		H
Stator insulation class		F
Cooling		Centrifugal fan
GENERATOR		**2500 G**
Overall weight	kg	60
Dimensions (L X W X H)	mm	555 x 385 x 295
Starting		Electrical / Manual
Fuel pump		Pressure reducer
Noise level		84 (58 dBA 7 m)
Operation Hours	h	7

3 SHIPPING, HANDLING, STORAGE

3.1 Storage

The generating set is protected during transport by suitable carton packaging and a wooden base. It must be stored horizontally, in a covered, dry and ventilated area.

INFORMATION ***Do not turn the package upside down. The correct position is the one shown by the symbol printed on the package (↑).***

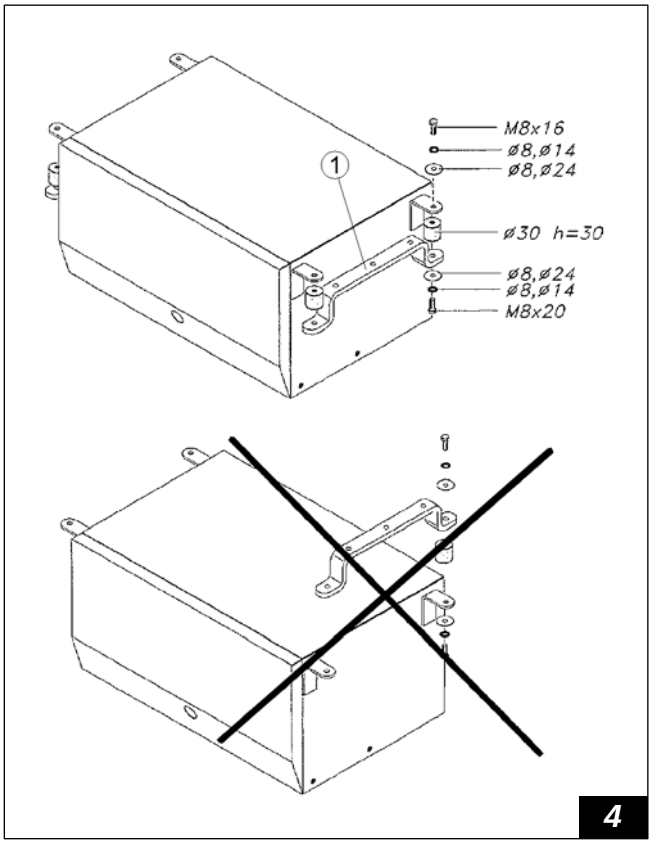
3.2 Weight

Total weight including packing:
ENERGY 2500 G: 60 kg

3.3 Handling

The generating sets, complete with their packaging, can be handled using common lifting and transport vehicles.
The boxes are provided with spacers in order to allow for the introduction of pallet truck forks.

DANGER ***During lifting and transport, comply with accident prevention and safety regulations. Use lifting and transport equipment with a capacity greater than the load to be lifted.***



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4 INSTALLATION

4.1 Preliminary information

MANUAL ***Before installing the generator set, it is absolutely necessary to read these instructions to prevent any installation errors.***

WARNING ***The generator must be installed so as to prevent water seeping directly into the alternator through the air inlets; it must therefore be protected.***

Incorrect installation of generating sets can cause irreparable damage to the equipment and endanger the safety of users.

Should the generating sets be installed not in compliance with the instructions in this manual, the Manufacturer shall not be held responsible for malfunctioning or for the safety of the generating set, by the terms of the Italian Law Decree D.M. 89/392/EEC. The Manufacturer shall also not be liable for any injury or damage to people or property.

DANGER ***Installation must be performed by qualified and adequately trained personnel only.***

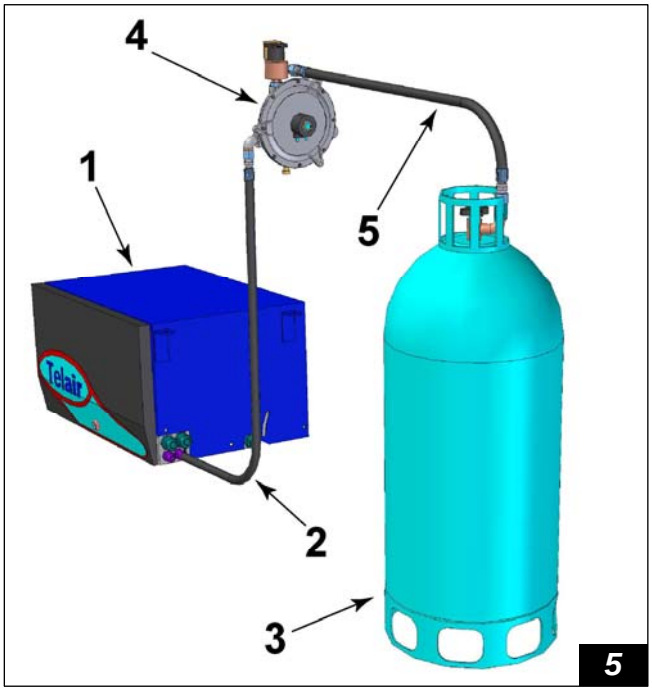
4.2 Instructions for fastening the generating set

The ***ENERGY 2500 G*** generating sets are provided with anchoring brackets with extra vibration dampers (Fig. 4, Ref. 1) and a fuel filter to be fitted along the generator feeding pipe. The brackets allow for hanging assembly.
This kind of assembly provides the following advantages: less room taken up, quick installation, easy access for routine and unscheduled maintenance.
Make sure that there is enough room around the hood of the generating set to let cooling air through; also leave 20 mm free room between the hood and the surrounding parts.
Should the generating set air intake be behind a wheel of the vehicle, **care should be taken to prevent water from being sprayed into the generating set by the wheel when raining**.

WARNING ***Ensure that, when the door is open, the engine sliding surface can be taken out (Fig. 9).***

4.3 FASTENING the pressure reducer

The generating set comes standard with the suitable pressure reducer (Fig. 5 Ref. 4) already set, and 1 metre long gas hose (Fig. 5 Ref. 2) which is already connected to both the generating set (Fig. 5 Ref. 1) and the pressure reducer.
The reducer should be fastened using the suitable holes located on the 3 wings (Fig. 7 Ref.1).



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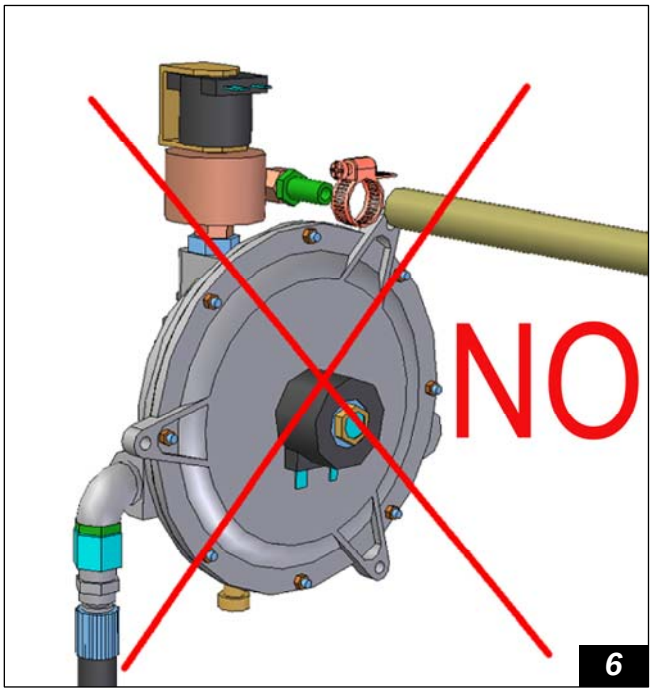

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DANGER ***Remember that the pressure reducer must NOT be installed in the body interior. Moreover, it should be located in a well-ventilated area.***

No pressure reducing device should be placed between the Telair reducer (Fig. 5 Ref. 4) and the gas bottle.
The gas hose (Fig. 5 Ref. 5) which directly connects the pressure reducer and the gas bottle (Fig. 5 Ref. 3) is not supplied.
For this connection, the installer will use a suitable type-approved hose which is equipped with the suitable fittings.

DANGER ***Connections as shown in Fig. 6 are FORBIDDEN on both the reducer and the gas bottle.***

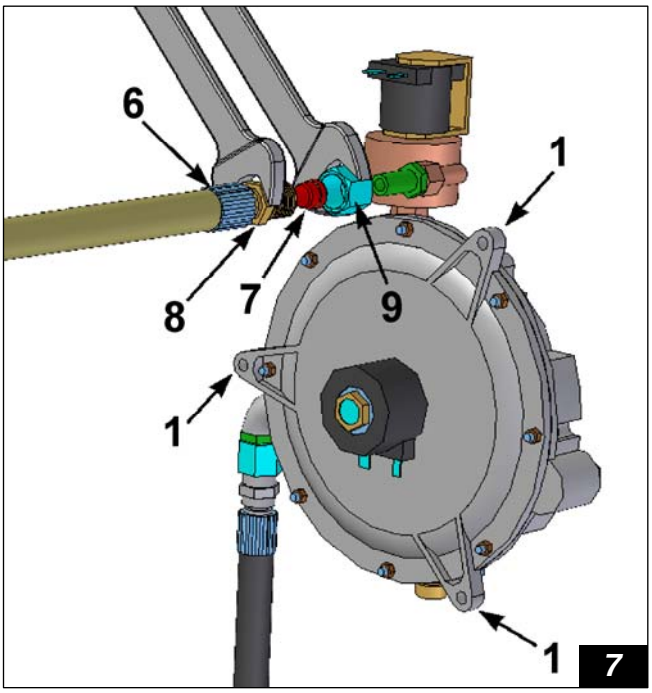

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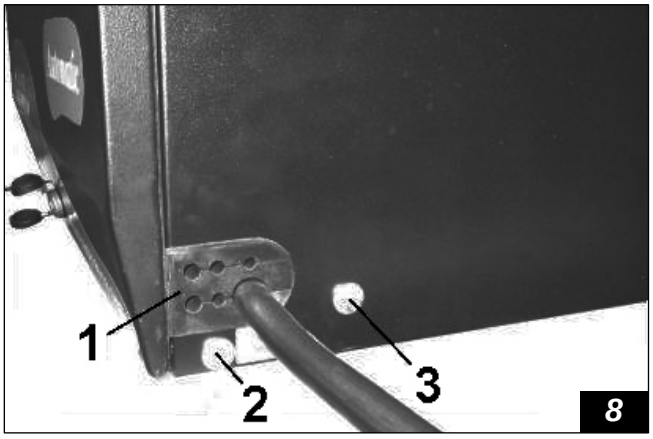
Fig. 7 shows proper connection, with a suitable hose on which the fitting (6) is tightened.
Fit the ogive (7), hold the fixed hexagon ring (8) by means of a wrench and tighten the ring nut (9).

4.4 Wiring connection instructions

By using the special key to open the lock, remove the front door.
Then remove the bottom surface locking screws (Fig. 8 Ref. 2) on both sides.
Take out the bottom surface with the engine all the way to the mechanical stop (Fig. 9).
If you wish to completely remove the engine surface, screw out the locking screws (Fig. 8 Ref. 3), too.



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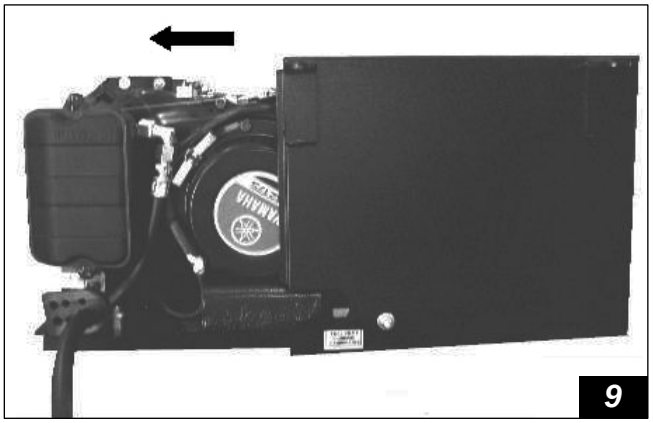
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4.5 Battery connection

To start up the generating set, connection to the battery of the vehicle must be provided using a sheathed power cable up to current standards, with the cross-section shown in Table 1.
To this end, the generating set is provided with two special terminals (Fig. 10 Ref. 2-3) used to connect the positive and negative poles of the battery.
Connect the cable of the positive pole (red cable) to the terminal already having a red cable and the cable of the negative pole (black pole) to the terminal already having a black cable. The cable of the negative pole must be of the same cross-section as the positive cable, and must be connected both to the negative pole of the battery and to the vehicle chassis.
Make sure there is good contact; remove any paint or rust from the contact surface, and protect the connection by applying grease.
The capacity of the battery to be used for starting up must not be less than **80 A/h**.
The soundproofing box is equipped with two cable outlets used to let through the battery connection cables (Fig. 8 Ref. 1).
The cable presser block is used to prevent water seeping into the power generating set.

INFORMATION ***Always fit a 70 A fuse onto the positive cable connecting the generating set to the positive pole of the battery.***

4.6 Electric Load connection

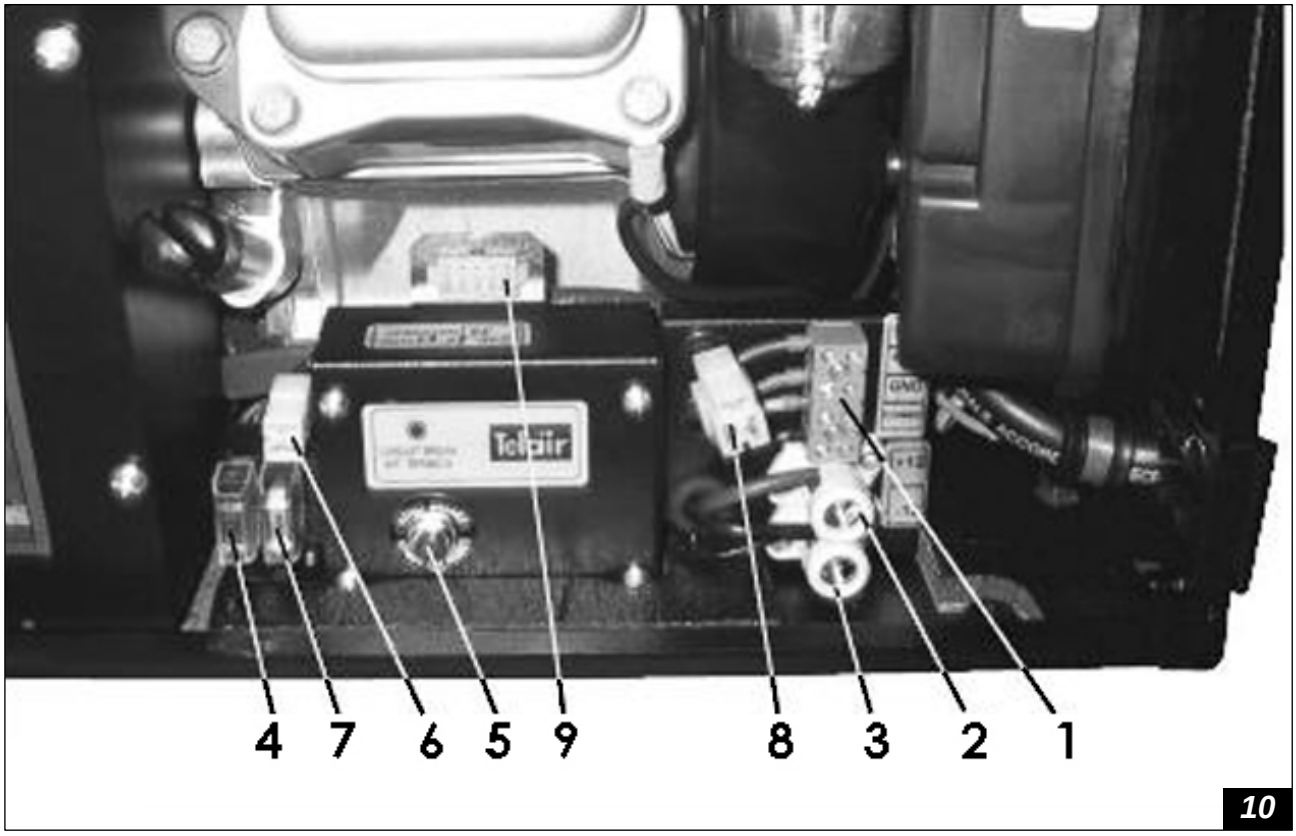
To connect loads to the power generating set, use a three-pole cable up to the applicable standards in force. The correct cross section is shown in Table 1.

Table 1

Model	Sect. mm^2 line 230 V	Cable leng. Lgth < 6 m	Cable leng Lgth. > 6 m
2500G	2.5	10	16
LINE CONNECTION 230 V		**BATTERY CONNECTION**	

For connection to the 230V input line, the generating set is equipped with a special terminal strip (Fig. 10 Ref. 1) to which the cables must be connected.
Use the special cable outlet (Fig. 8 Ref. 1) to prevent water seeping into the generating set.
Although the generating set is equipped with a special internal thermal cut-out to cut power delivery in the event of overload or short circuits (Fig. 10 Ref. 5), it is advisable to install (in the vehicle control panel) a thermomagnetic cut-out switch, suitably set to stop power delivery to the various users when current absorption exceeds 9.5 Amp for ***ENERGY 2500 G***.
If the generating set thermal cut-out switch has been operated, press the button (Fig. 10 Ref. 5) to restore closed circuit and power delivery conditions.

DANGER ***Carefully check the position of the line connection for picking up 230 Volt current. Wrong connection could damage the generating set irreparably or create dangerous short circuits*.**



4.7 Auxiliary electric cable connection

All 3 auxiliary cables to connect are equipped with a polarized connector.
One cable is necessary for generator operation, while the other 2 are optional cables.

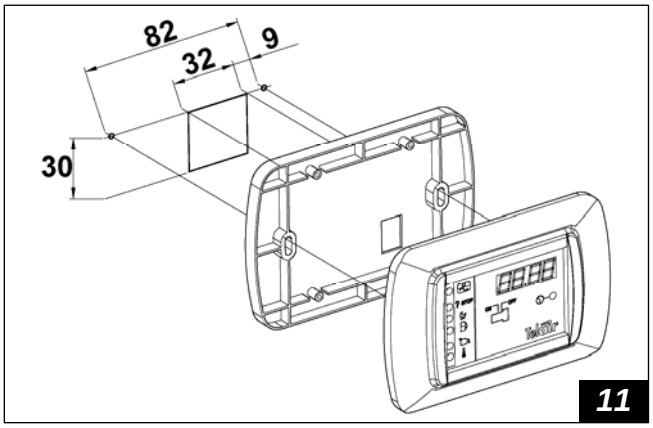
- Cable from the generating set to the control panel (mandatory). It is included in the standard supply and is 5 metres long. Check that its length is sufficient to cover the chosen rout between the generating set and the control panel. Optional cables in longer sizes are also available. **Also see paragraph 4.8**.
  After leading the cable through the cable outlet block (Fig. 8 Ref. 1) connect the white connector to the fixed connector (Fig. 10 Ref. 9) provided inside the generating set, checking that the plugging direction is correct.
- A cable is delivered standard together with the generating set for connection from the generating set to the pressure reducer. It is already connected to the pressure reducer. Let the cable through the cable holder (Fig. 8 Ref. 1) and connect the 3-pole white connector to the fixed connector (Fig. 10 Ref. 8) which is located inside the generating set near the 12 Vdc terminals.
- Cable from the generating set to the auxiliary battery charger (optional). From the bipolar connector (Fig. 10 Ref. 6) it is possible to derive supply for an RCB battery charge regulator via two 4 mm^2 cables; **also see paragraph 4.9.1**.

4.7.1 Electric System fuses

The unit is provided with two protection fuses.
A 15-Ampere fuse (Fig. 10 Ref. 7) protects the auxiliary battery charger output.
A 4-Ampere fuse (Fig. 10 Ref. 4) protects the pressure reducer output.

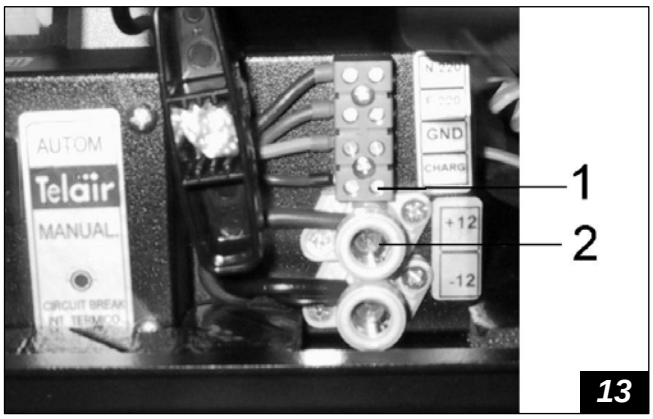
4.8 Electronic control panel connection

Choose your required position for the control panel inside the vehicle and drill a 30 x 32 mm rectangular hole. After letting out of the hole the connecting cable coming from the generating set (paragraph 4.7) connect the cable black connector on the back of the electronic control panel. Fix the electronic control panel (Fig. 11) by using 3 x 20 mm self-tapping screws, making sure that the rear part does not interfere with other surfaces. Apply light pressure to fix the plastic frame, until the anchoring tabs click in.



4.9 Battery charger

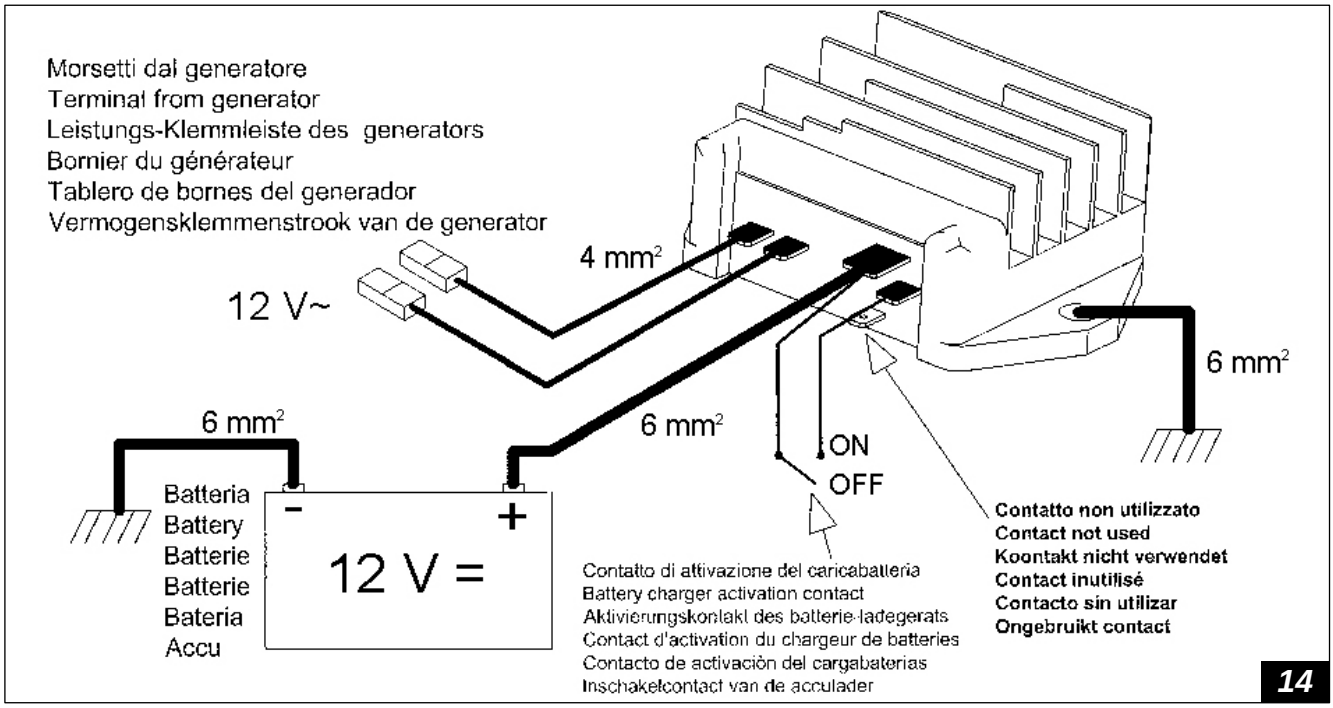
ENERGY 2500 G generating sets are equipped with a battery charger which can deliver current of approximately 10 Amp at 12 V. It can be used to recharge the generating set start-up battery.
To obtain this function, use a 2.5 mm^2 cross-section cable to connect the terminal identified by CHARG (Fig. 13 Ref. 1) to the positive pole (red cable) of the generating set (Fig. 13 Ref. 2).



4.9.1 Auxiliary Battery Charger

If you wish to recharge a different battery or do not wish to use the CHARG terminal, it is possible to use the 12 Volt alternating current output provided on the bipolar connector shown in Fig. 10 Ref. 6.
To these two Faston terminals, 2 4 sq.mm cross-section cables should be connected to obtain interfacing to an optional RCB regulator (code 05424) as shown in Fig. 14.

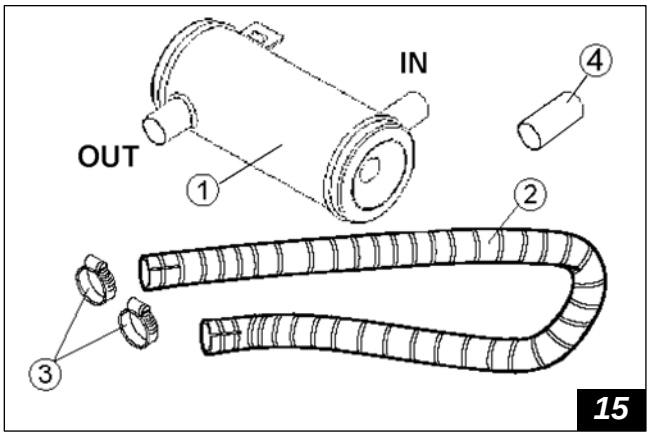
INFORMATION ***The generating set will not autonomously recharge the battery used for starting-up unless this is connected to a battery charger.***



4.10 Connecting an additional silencer

To further reduce the generating set operating noise, an (optional) additional silencer can be installed externally.
The additional silencer kit code 02482 consists of:

- A silencer code 02019 (Fig. 15 Ref. 1).
- A one-metre long section of flexible steel tubing code 00433 (Fig. 15 Ref. 2).
- Two connection fastening clamps code 00543 (Fig. 15 Ref. 3).
- One hose coupling code 03645 (Fig. 15 Ref. 4).



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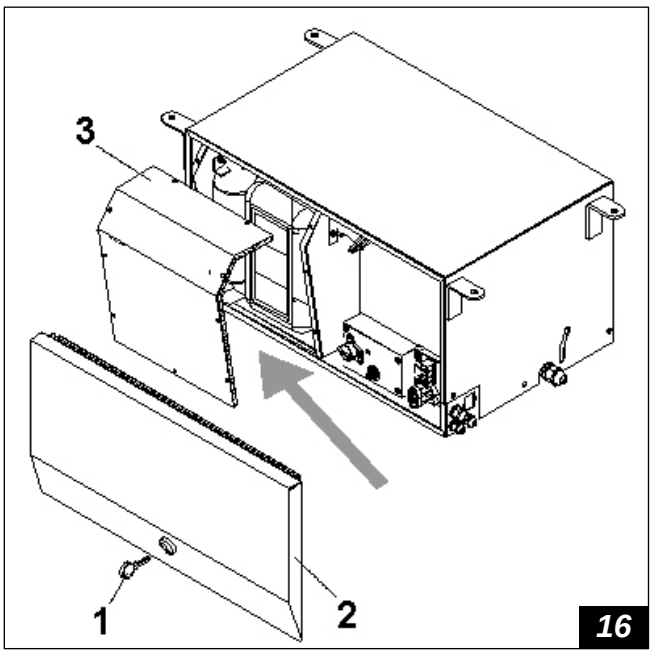
To connect the silencer to the generating set, first of all remove the door (Fig. 16 Ref. 2) by using the special key (Fig. 16 Ref. 1) and the muffler guard (Fig. 16 Ref. 3).



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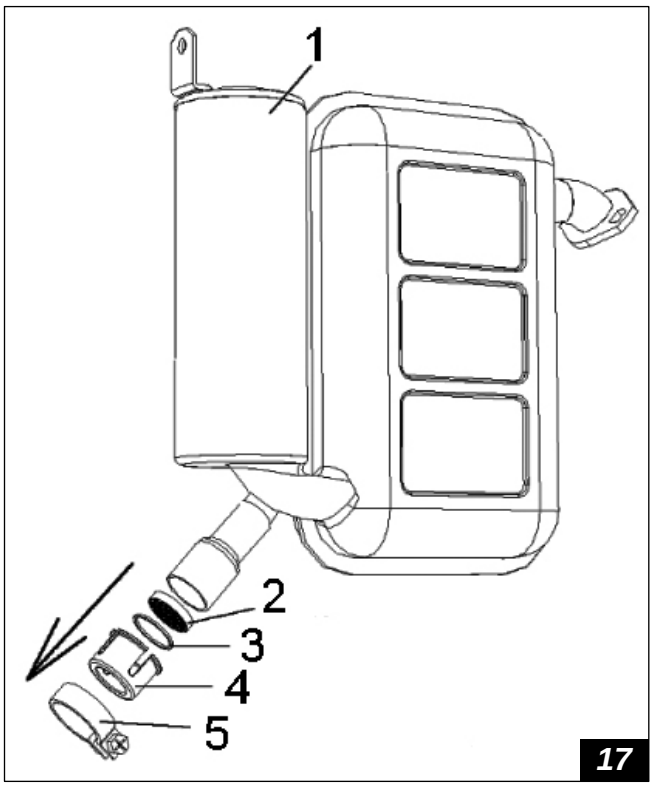

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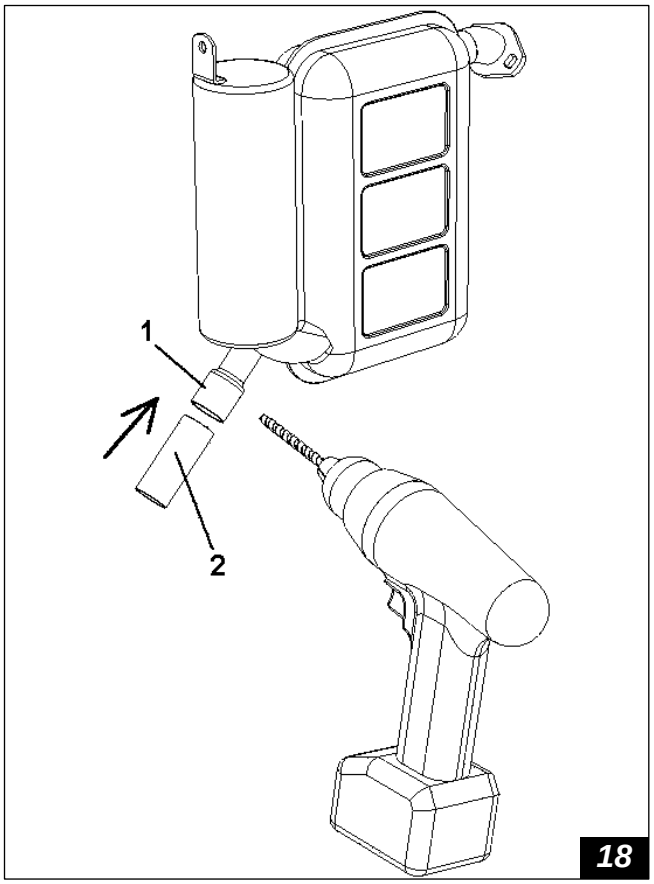
Now remove all the flame trap parts (Fig. 17 Ref. 2 – 3 – 4 – 5) from the muffler (Fig. 17 Ref. 1).



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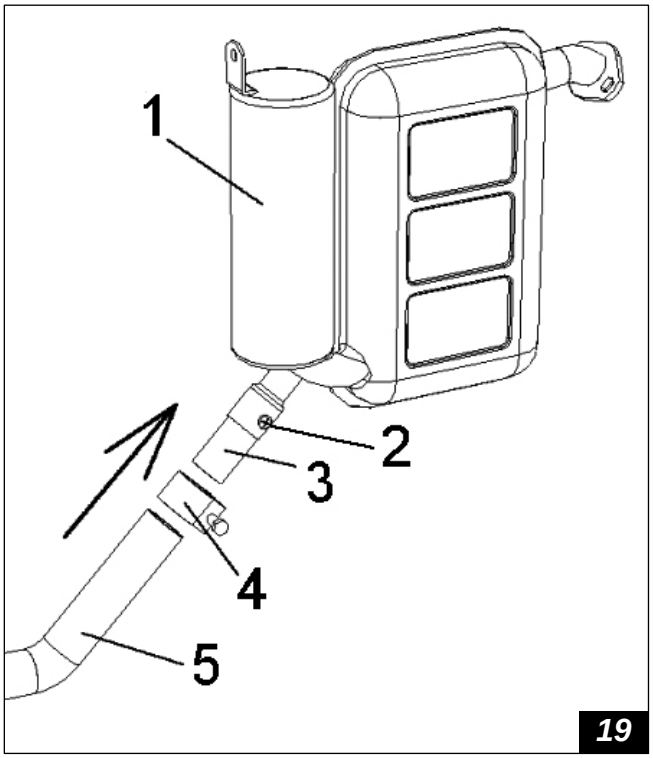
After introducing the coupling code 03645 (Fig. 18 Ref. 2) into the muffler terminal (Fig. 18 Ref. 1), drill a small hole in the muffler terminal - large enough to accept a self-tapping screw to lock the muffler terminal (Fig. 19 Ref. 2).
Now insert the hose code 00433 (Fig. 19 Ref. 5) on the coupling (Fig. 19 Ref. 3).
Lock the hose with the clamp code 00543 (Fig. 19 Ref. 4).



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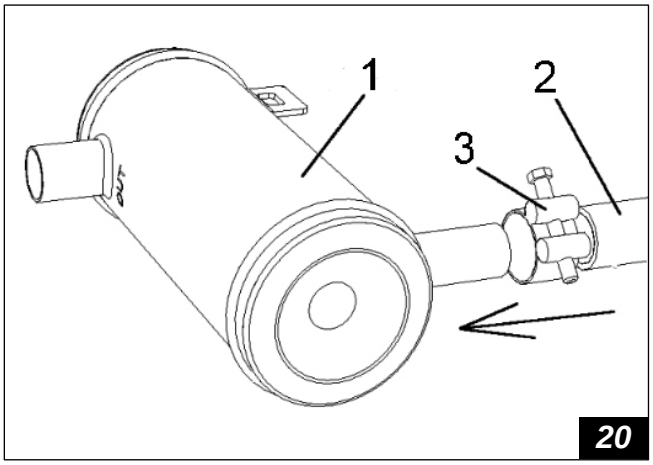
Fix the flexible hose (Fig. 20 Ref. 2) to the silencer terminal on the inlet side (Fig. 20 Ref. 1) by using the other supplied clamp (Fig. 20 Ref. 3).



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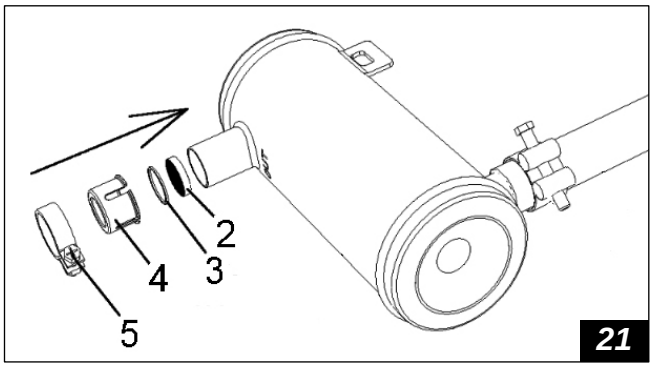

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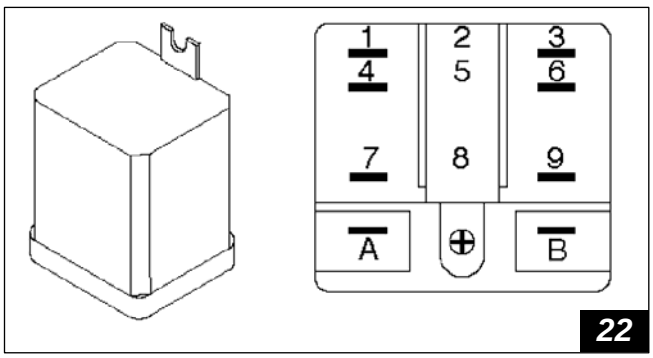
Replace the flame trap parts (Fig. 21 Ref. 2 – 3 – 4 – 5) on the silencer terminal and, by using the bracket welded on the silencer, fix it at a position where it is not likely to hinder electric cables or fuel pipes.

WARNING ***Do not use silencers not supplied by Telair. Silencers that have not been specially sized may damage the motor.***

4.11 Connecting an External Network Relay

An (optional) relay or change-over switch code 05423 (Fig. 22) should be fitted to the vehicle wiring system. Its purpose is to insulate the generating set when the vehicle is connected to an external electric input network.
Connect the relay (Fig. 23) according to the following instructions:

- Connect the two wires of the 230 V line of the generating set to the PINS 1 - 3.
- Connect the user line to the PINS 7 - 9.
- Connect the outside line to the PINS 6 – 4.
- Jumper the PINS 4 – A.
- Jumper the PINS 6 – B.
- Connect all the grounding cables together



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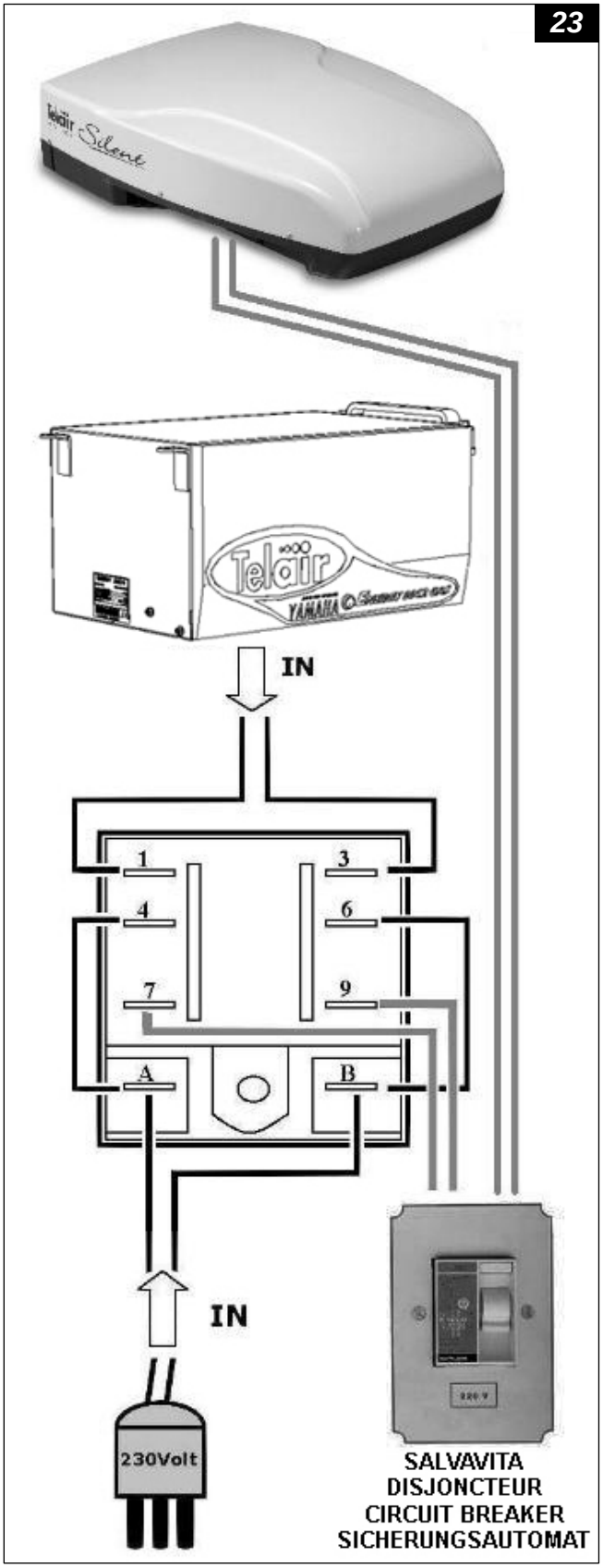
DANGER ***Electric connections to the generating set should be carried out by skilled electricians only.***



5 OPERATING INSTRUCTIONS

WARNING ***The generating set is delivered without engine oil.***
Use detergent oil for multigrade 4-stroke petrol engines, having SAE viscosity suitable for the operating climate (see table and detailed indications on the user and maintenance manual of the engine).

ENERGY series generators consist of petrol internal combustion engines connected to an alternator that can produce both alternating and direct electrical current. The generating sets are assembled inside a steel plate casing, insulated and sound-proofed using special sound absorbing materials.
Fuel is fed to the internal combustion engine via a pump fitted to the generating set as part of the standard supply.

5.1 Machine safety

The generating sets come with perfectly sealed casings, so there is no danger of contact with any moving or high temperature parts or with live cables.
The doors open with a lock and key. The keys must not be left within the reach of children or inexperienced persons.

DANGER ***The generating sets must only and exclusively be used with their doors shut.***
Remove any flammable substance (for example: petrol, paints, solvents, etc.) from near the generating sets.
Make sure that any hot parts of the generating sets are not in contact with any flammable material.
Never fill up the fuel tank while the engine is running.
Never touch the generating sets or the wiring connections with wet hands.
Never replace the fuses or the cut-out switches with others having higher amperage.
Should any electrical part need checking, this must only be done with the engine turned off and by specialised personnel.

The generating sets have been built in compliance with the safety standards listed in the CE statement of compliance.

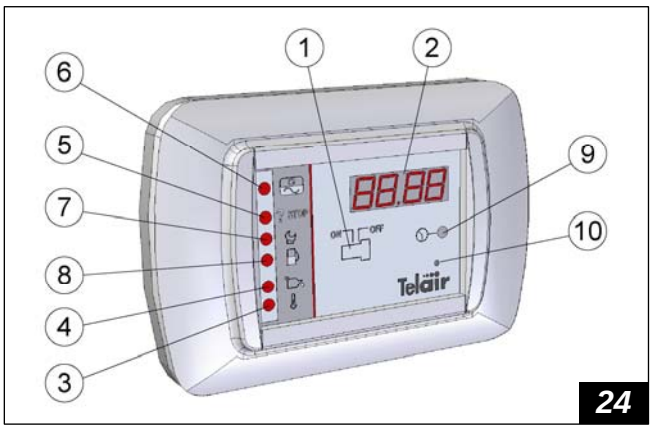
6 USING THE GENERATING SET

6.1 Starting up the generating set

The generating sets are provided with an electronic remote control panel which allows you to perform starting up / turning off operations and to check their running conditions.
The panel controls are:

1 ON/OFF switch
2 Display unit
3 High temperature indicator
4 Engine minimum oil level indicator
5 Startup failed
6 Generator running indicator (flashing)
7 Engine oil change indicator
8 Gas reserve indicator
9 Display time changeover switch
10 Reset

Set the startup switch (Fig. 24 Ref. 1) to its "**ON**" position. The message "WAIT" will be displayed for 8 seconds. After this time, the electronic control panel will start the first automatic procedure for starting up the generating set. If the engine starts up at the end of this phase, the "generator running" indicator light (Fig. 24 Ref. 6) will start to flash.
Should the engine not start up, this automatic procedure will be repeated up to 4 times.
If, at the end of a complete cycle, the engine has not yet started up, the "startup failed" indicator (Fig. 24 Ref. 5) will light up to signify that the generating set has failed to start up.
If the "startup failed" indicator (Fig. 24 Ref. 5) light only stays lit, you can repeat the procedure several times.



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If the generating set has not started up after several attempts, contact the manufacturer's After-sales service.
The start-up battery should never be disconnected, as there would be no input to the electronic control panel which would prevent the generating set from working.

6.2 Turning the generating sets off

To stop the generating set, set the switch 1 to its "OFF" position (Fig. 24 Ref. 1).

DANGER ***The generating set is provided with an internal combustion engine, therefore, the fuel used is highly flammable.***
The exhaust gases are conveyed under the casing; their temperature, inevitably, is quite high, even though they are mixed with cooling air.
Do not touch the casing areas near the exhaust, and do not put your hands or any objects inside the casing.

6.3 Information on not recommended uses

DANGER ***These generating sets must be installed and used by qualified and authorised personnel only, according to the manufacturer's instructions. These generating sets must only and exclusively be used to produce electrical power on vehicles provided with an electrical system built to standards and according to the quantity of power delivered.***

6.4 Useful tips

To make the best use of the generating sets, remember that even minor overloads - if they last long enough - will operate the thermal cut-out switches (Fig. 10 Ref. 5).
During the running-in period, do not subject the new engine to loads exceeding 70% of the rated load, at least for the first 50 running hours.

6.5 Control and alarm functions (Fig. 24)

2 Display: when the generating set has started up, the total running hours will be displayed. Press the key provided below the control panel display unit (Fig. 24 Ref. 9) to display the number of generating set operation hours since the latest engine oil change.
3 High temperature indicator: this warning light will light up when the temperature of the generating set goes over its safety value; the engine will stop at the same time.
4 Engine oil minimum level indicator: this warning light will light up to indicate that oil in the engine has gone below the minimum level. A safety system will kill the engine automatically to prevent failures.
5 Engine startup failed: this warning light will light up to indicate that the generating set has not started up, after all four start-up attempts.
6 Generator running indicator: this indicator flashes during proper operation of the generating set.
7 Change oil: this warning light will light up when the engine has reached 100 running hours since the latest oil change. Every time the oil is changed, the After-sales service staff must reset the timer to zero.
8 Gas reserve indicator: if a reserve detector is provided in the gas tank, it is possible to connect the suitable cable located inside the generating set (Fig. 10 Ref. 8). This way the pilot lamp will light up when the gas level has gone below its reserve level.
9 Display time changeover switch: press this switch to display the running hours since the latest engine oil change.
10 Reset: When the display shows characters without any apparent logic, the panel needs to be reinitialised. Press the Reset key (Fig. 24 Ref. 10) and, holding it down, switch on the panel. When 4 zeroes (0000) are displayed, the panel has been reinitialised.

6.6 Control panel alarm causes and resetting

During generating set use, alarm signals may be displayed referring to engine oil checks. After checking the engine oil, the control panel must be reset in the following way:

Alarm: *the red 'service' light is flashing.*
Cause: *50 hours have elapsed since the latest engine oil change and oil level should be checked.*
How to reset the alarm: *press the partial counter key (Fig. 24 Ref. 9) and while holding it down, turn the panel on and release the push-button when the unit has started up*

Alarm: *the red 'service' light is lit.*
Cause: *100 hours have elapsed since the latest engine oil change and engine oil should be changed.*
How to reset the alarm: *turn on the panel and wait for the generating set to start. Now press the button hidden under the small hole in the bottom right corner (Fig. 24 Ref. 10) and release it immediately thereafter.*
Wait a couple of minutes before turning the generating set off.

In certain situations, the data contained in the microprocessor inside the panel may be altered. This may be because the battery is very low, or because the cables used to connect the battery to the set have too small cross-sections. Altered processor data may prevent the generating set from running. In order to restore the generating set operating efficiency, proceed as follows:

Alarm: *the display unit shows random characters.*
Cause: *malfunctioning due to low voltage during start-up (low battery, cable cross-section too small). Reinitialise the panel.*
How to reset the control panel: *press the button (Fig. 24 Ref. 10) and while holding it down, turn on the control panel. Only release the push-button when 4 zeros (0000) are displayed. The panel has been reinitialised.*

7 MAINTENANCE INSTRUCTIONS

INFORMATION ***Only use original spare parts. Using poorer quality spare parts may damage your generating set.***
Routine checks and adjustments are of the essence in preserving a high level of performance. Routine maintenance also ensures long generating set life.

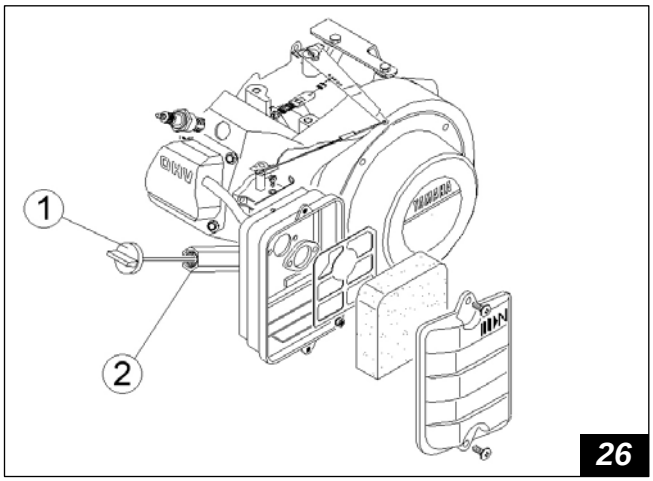
DANGER ***Before performing any check or maintenance operation on the generating set, turn the ON/OFF switch of the control panel to the OFF position.***
Then disconnect the red 12 Vdc cable from the terminal (Fig. 10 Ref. 2)
This way you can operate under safe conditions as the generating set cannot start up.

7.1 Service check list
See table at the bottom of page 21.

7.2 Maintenance not requiring specialised personnel
To perform this kind of service, it will be necessary to open the generating set door. The following precautions must therefore be taken:
1 The generating set must not be in operation, and all its parts must be cold
2 Let the generating set cool off.

7.3 Checking the engine oil level
- Unscrew the engine oil filler cap and clean the dipstick (Fig. 26 Ref. 1).
- Put the dipstick back in without screwing.
- Take the dipstick out again, and make sure that the engine oil level is between the two (min and max) notches. Should the oil level be below the minimum notch, restore the oil level using the recommended type of engine oil (refer to the engine user and maintenance manual).
- Put the dipstick and filler cap back on and screw tightly.

WARNING ***Do not fill to exceed the maximum level, as this could cause malfunctioning of the fuel pump and hence of the generating set.***



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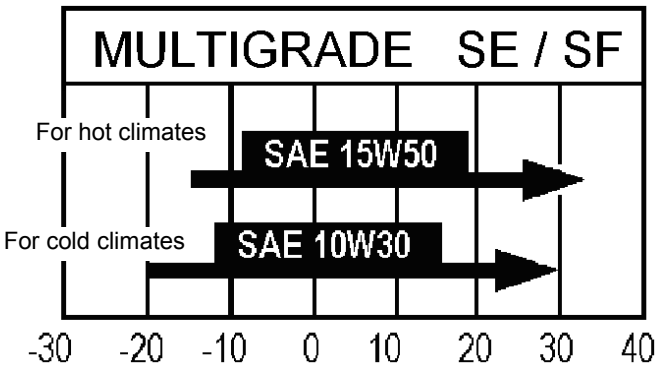
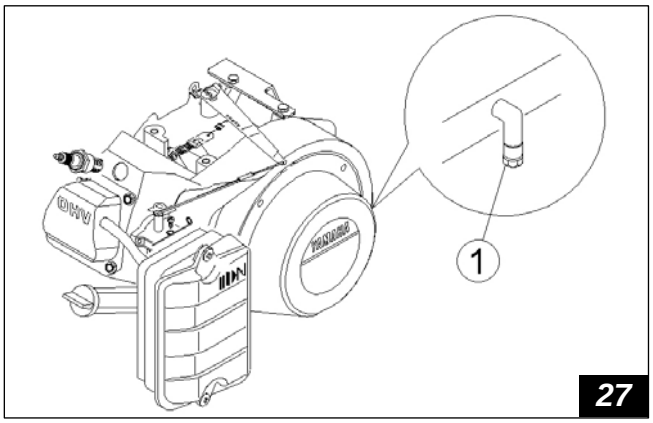
INFORMATION ***All engine oil level checking operations must be performed with the generating set in a perfectly horizontal position.***

7.4 Maintenance operations to be carried out by qualified personnel
To carry out certain servicing operations, it is possible to extract the engine-alternator assembly from the front. (See paragraph 4.4).
This will make it easier to obtain access to all the inside parts of the generating set for unscheduled maintenance or repair operations.

7.4.1 Engine oil replacement
Use multigrade detergent oil for four-stroke petrol engines having a SAE viscosity degree suited to the climate the generating set is working in (see table and detailed instructions in the engine use and maintenance manual).



To make it easier to drain the spent engine oil, it is advisable to let the engine run for 3 - 5 minutes; in this way, the oil will be more fluid and emptying will be quicker and more thorough.



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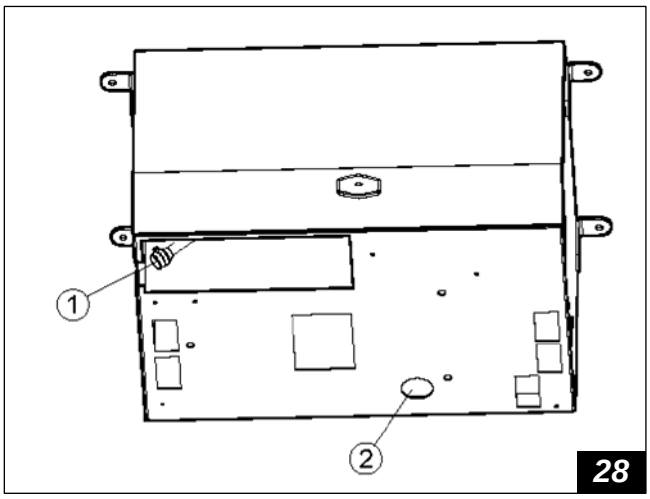
Undo the special cap on the soil sump (Fig. 27 Ref. 1) which can be reached through a special hole under the sound-proofing case (Fig. 28 Ref. 2) and allow all the contained oil to be drained to a collecting tank.



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After doing this, screw the cap back on and restore the oil level inside the oil sump, using the filler hole (Fig. 26 Ref. 2).
Check the following table for the right amount of oil to pour in the sump (Table 2).

Table 2

MODEL	Oil quantity (litres)
Energy 2500 G	0.6

DANGER

- ***Hot oil can scald.***
- ***Causing the engine to run when the oil level is too low can seriously damage it.***
- ***Check the oil level when the engine has been turned off***.

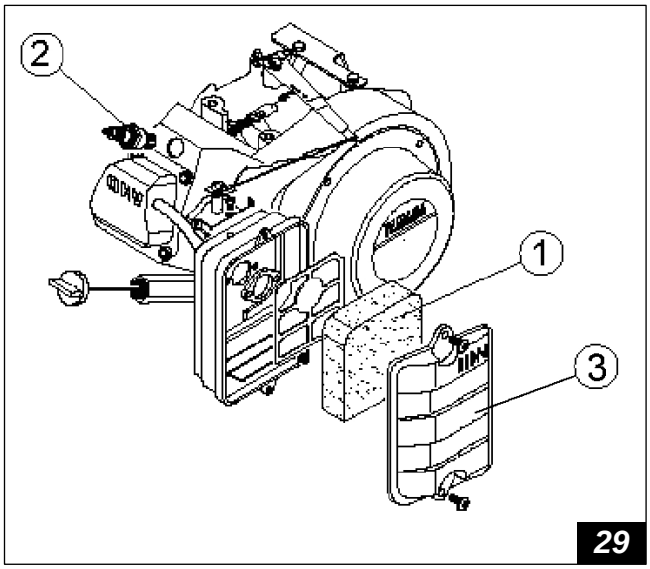
INFORMATION ***Spent oil should not be disposed freely in the environment but taken to special disposal centres carrying out disposal and/or recycling in compliance with the applicable law provisions in force in the country of use.***

7.4.2 Air filter maintenance

INFORMATION ***A clogged air filter will reduce air flow to the carburettor. To prevent carburettor malfunction, check the air filter regularly. If the engine is used in a heavily dusty environment, we suggest checking the air filter every time before starting up the engine.***

DANGER ***Never use Diesel oil or solvents with a low evaporation point for cleaning the air filter cartridge, as this could cause fires or explosions.***

Never operate the engine without an air filter; the engine would wear down quickly due to air-borne dust.
To access the filter cartridge, remove the air filter closing lid (Fig. 29 Ref. 3) after having unscrewed both screws that fix it to the air filter box.



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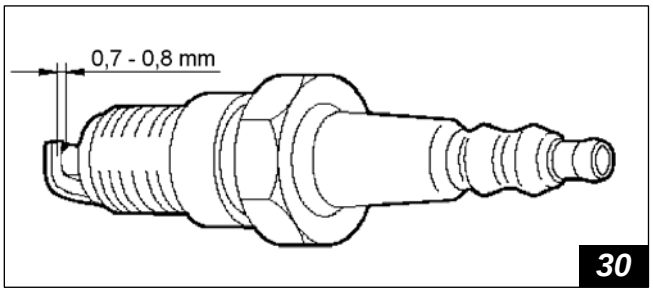
Take out the cartridge (Fig. 29 Ref. 1) and wash it in mild detergent and water then rinse thoroughly. Let the filter cartridge dry out completely, then dip it in clean engine oil. Squeeze out carefully any excess oil.
Replace the cartridge only if visibly worn out.

7.4.3 Spark plug maintenance

For both models of generating sets, use spark plug models BP6ES, BPR6ES (NGK), W20EP-U, W20EPR-U (ND) or else spark plugs made by other manufacturers but compatible with the above.
Never use spark plugs with a different temperature degree from those listed above.

- Take the cap off the spark plug (Fig. 29 Ref. 2) and using the special wrench take out the plug.
- Perform a visual inspection. Replace in case of obvious wear or if the insulator is broken or cracked.
- Use a steel brush to clean the spark plug, if it can be used again.
- Use a thickness gauge to measure the distance between the electrodes. The right distance should be between 0.7 and 0.8 mm (Fig. 30).



- Correct the distance if necessary, bending the side electrode.
- Make sure that the spark plug washer is in good condition and then screw back on by hand to make sure that it is correctly put back in place. Finally, tighten to the right torque using the special wrench (see instructions in the engine user and maintenance manual).

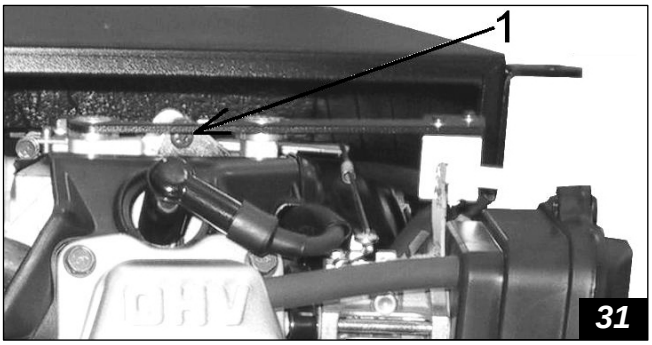
INFORMATION ***When assembling a new spark plug, tighten by 1/2 turn after the spark plug has compressed the sealing washer.***
If you put back the old plug after having removed it, tighten it by 1/4 turn after it has compressed the sealing washer.

WARNING ***The spark plug must be tightened firmly. A badly positioned spark plug may become very hot and damage the engine.***

7.4.4 Voltage adjustment

Adjust the voltage when the engine is hot without any applied load and the generating set is running.

Check the voltage of the generating set using a voltmeter via a 230 V vehicle socket. The voltage must be between 230 V and 245 V without any connected user.
If different values are measured, it will be necessary to set the right values by working on the engine rpm adjustment screw (Fig. 31 Ref. 1).



Turn the screw clockwise to increase the engine rpm and consequently, the voltage.
Turn the screw counter-clockwise to decrease the engine rpm and consequently, the voltage.

8 ROUTINE MAINTENANCE SCHEDULE

ROUTINE MAINTENANCE SCHEDULE To be performed after the period of time or the number of running hours listed here, whichever the earlier.		Every use	First Month or 20 hours	Every 3 Months or 50 hours	Every 6 Months or 100 hrs	Every 12 Mths or 300 hrs
Engine Oil	Level check	■				
	Replacement		■ (2)	■ (2)		
Air Filter	Clean and replace if necessary		(1)■(2)			
Fuel Filter and Tank	Clean and replace if necessary					■ (2)
Spark plug	Clean and replace if necessary			■ (2)		
Valve Adjustment	Check - Adjust					■ (2)
Fuel Pipe	Check for leaks or cracks					■ (2)
Muffler	Check for leaks or cracks					■ (2)
	Clean and replace spark screen if necessary				■ (2)	
Air Choke Valve	Check correct operation				■ (2)	
Engine rpm or Frequency	Check - Adjust				■ (2)	
Vibration Damper Suspension Points	Check – Replace if necessary					■ (2)

NOTES: (1) Clean more frequently if you use it in a very dusty environment.
(2) These operations must be performed by specialised personnel only.

9 DISMANTLING

Should you have to dismantle the generating set, contact specialised companies.

10 RECOMMENDED FIRE-FIGHTING EQUIPMENT

In case of fire, never open the generating set casing and use only approved type fire extinguishers.

DANGER ***Never use water to put out flames in the generating set.***

GENERAL WARRANTY TERMS

TELAIR guarantees its products against any construction material and/or manufacturing faults and defects.

The right to warranty cover for new engines is valid for a period of 24 months from the time of handing over to the end user, or for a maximum of 2000 operating hours, whichever limit is reached first. In all cases the warranty period shall end no later than 26 months (28 months if delivered outside of Europe) after ex factory delivery.

For electric and hydraulic components, pipes, belts, sealing elements, injection nozzles, clutches, drives, the warranty term is 12 months from the time of handing over to the end user, or a maximum of 2000 operating hours, whichever limit is reached first. In all cases the warranty period shall end no later than 14 months (16 months if delivered outside of Europe) after ex factory delivery.

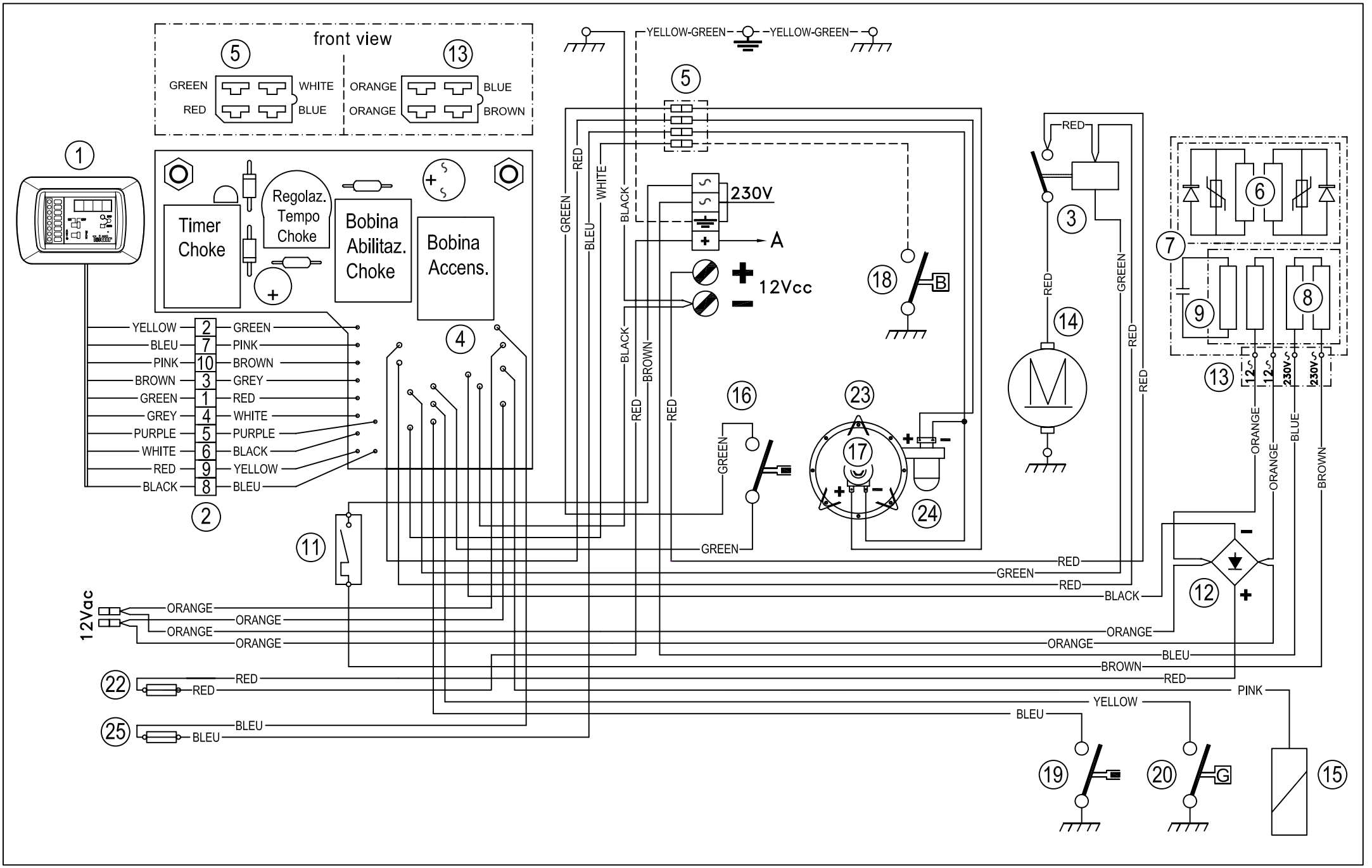
In any case, the costs of lubricants and consumables shall be charged.
Any transport expenses shall have to be covered by the purchaser; the same applies to any expenses connected with inspections requested by the customer and accepted by ***TELAIR***.

The manufacturer's warranty shall only be valid if:

- the customer has carried out all routine maintenance according to the recommended schedule and has promptly visited the nearest after-sale centre if required.
- the customer can produce a document showing the date of sale (invoice or receipt).
  Such document will have to be kept with care and be intact when produced to the ***TELAIR*** After-Sales centre on requesting service.

In any case, the purchaser shall not be entitled to:

- terminate the contract;
- claim damages to persons or property;
- ask that the warranty be extended in the event of product defects or malfunctioning.


front view
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GREEN
RED
WHITE
BLUE
13
ORANGE
ORANGE
BLUE
BROWN
1
Timer Choke
Regolaz. Tempo Choke
Bobina Abilitaz. Choke
Bobina Accens.
4
2
YELLOW 2 GREEN
BLEU 7 PINK
PINK 10 BROWN
BROWN 3 GREY
GREEN 1 RED
GREY 4 WHITE
PURPLE 5 PURPLE
WHITE 6 BLACK
RED 9 YELLOW
BLACK 8 BLEU
YELLOW-GREEN
YELLOW-GREEN
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12Vcc
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ORANGE
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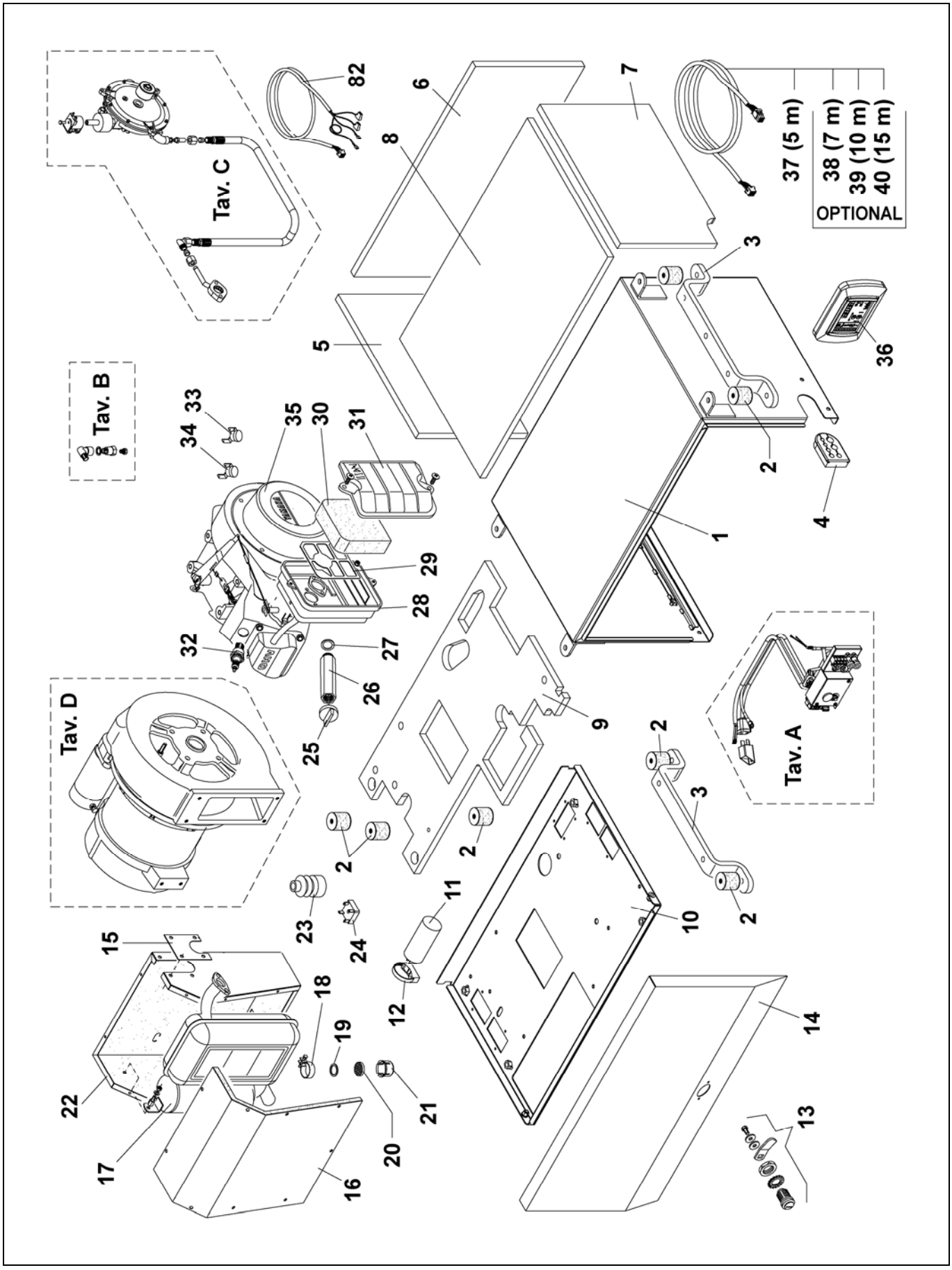
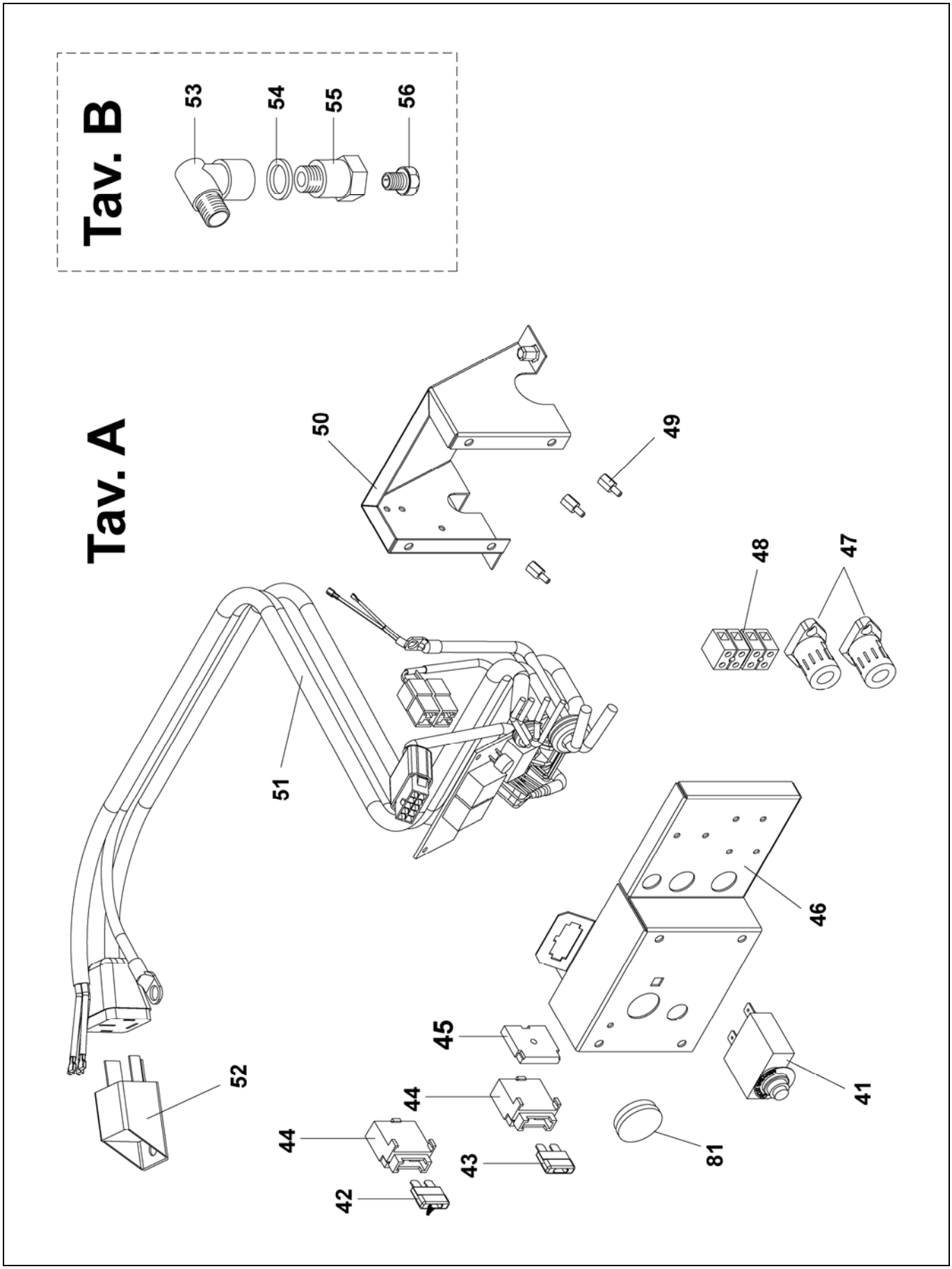
Pos.	Description	Pos.	Description
1	Electronic control panel	14	Starter
2	Electronic control panel connector	15	Ignition coil
3	Startup relay	16	Choke Enabling Thermostat
4	Electronic control board	17	Automatic air electromagnet
5	Gas wiring connector	18	Fuel reserve
6	Rotor	19	Engine temperature thermostat
7	Alternator	20	Low oil level float
8	Stator	21	Startup battery connection terminals
9	Condenser	22	Diode bridge protection fuse
10	Power connection terminal board	23	Pressure reducer
11	Thermal switch	24	GAS solenoid valve
12	Diode bridge	25	GAS Wiring Protection Fuse
13	Alternator Connector	A	Battery charger terminal

DRAWING FOR SPARE PARTS LIST ENERGY 2500 G




Tav. B
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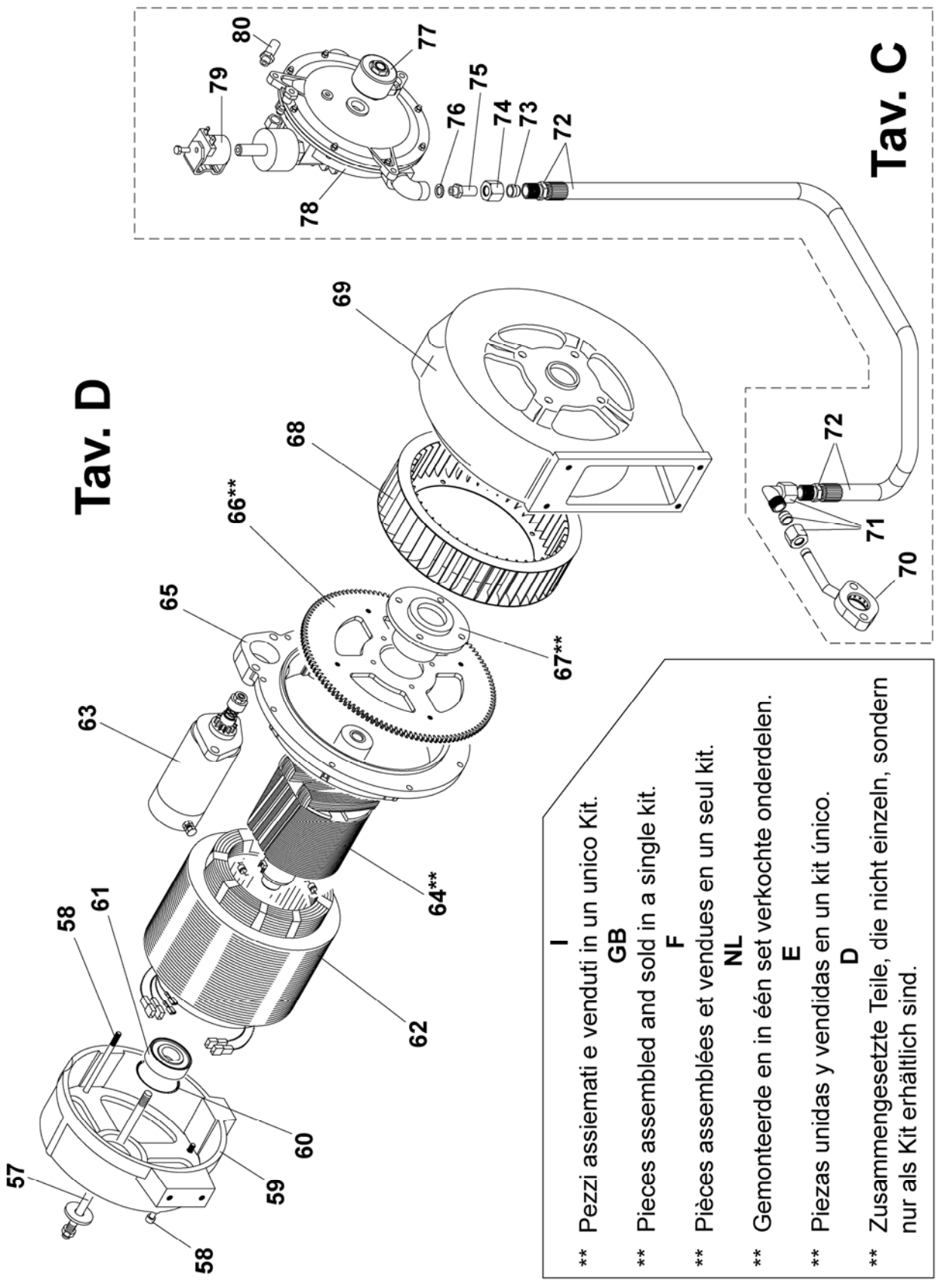

I
** Pezzi assiemati e venduti in un unico Kit.

GB
** Pieces assembled and sold in a single kit.

F
** Pièces assemblées et vendues en un seul kit.

NL
** Gemonteerde en in één set verkochte onderdelen.

E
** Piezas unidas y vendidas en un kit único.

D
** Zusammengesetzte Teile, die nicht einzeln, sondern nur als Kit erhältlich sind.

Pos.	Code	Q.tà	Descrizione Description	Dèsignation Bezeichnung	Denomination Descripcion
1	03895	N. 1	Cofano superiore Upper hood	Capot supérieur Obere Haube	Bovenste kap Capó superior
2	00632	N. 7	Antivibrante Vibration damper	Antivibratoire Schwingungsdämpfendes Element	Trillingsdemper Anti-vibrador
3	01671	N. 2	Staffa ancoraggio Anchor clamp	Bride de fixation Befestigungsbügel	Verankeringsbeugel Estribo de anclaje
4	03804	N. 1	Tassello Portacavi Carburante Fuel Cable Holder	Serre-câbles Carburant Kabelschelle Kraftstoff	Kabeldoorvoer Brandstof Taco Portacables Carburante
5	03906	N. 1	Isolante Sinistro Cofano Left hood insulation	Isolation Gauche Capot Isolierung links für Haube	Isolatie links voor kap Aislante Izquierdo Capó
6	03907	N. 1	Isolante Posteriore Cofano Rear hood insulation	Isolation Arrière Capot Isolierung hinten für Haube	Isolatie achter voor kap Aislante Trasero Capó
7	03905	N. 1	Isolante Destro Cofano Right hood insulation	Isolation Droite Capot Isolierung rechts für Haube	Isolatie rechts voor kap Aislante Derecho Capó
8	03904	N. 1	Isolante Superiore Cofano Upper hood insulation	Isolation Supérieure Capot Isolierung für obere Haube	Isolatie boven voor kap Aislante Superior Capó
9	03903	N. 1	Isolante Basamento Base insulation	Isolation Base Isolierung für Grundrahmen	Isolatie voor onderstel Aislante Base
10	03894	N. 1	Basamento cassa Case base	Base de la caisse Kasten-Grundrahmen	Onderstel kast Base caja
11	00524	N. 1	Condensatore 13 µF 450 V Condenser 13 µF 450 V	Condensateur 13 µF 450 V Kondensator 13 µF 450 V	Condensator 13 µF 450 V Condensador 13 µF 450 V
12	00653	N. 1	Collare per tubo 25/60 Collar for pipe 25/60	Collier pour tuyau 25/60 Schelle für 25/60 Rohr	Kraagring voor pijp 25/60 Collar para tubo 25/60
13	01224	N. 1	Serratura Lock	Serrure Schloss	Slot Cerradura
14	01829	N. 1	Lamiera di chiusura sportello Door closing plate	Tôle de fermeture de porte Türblech	Afdekplaat deurtje Chapa cierre puerta
15	01833	N. 1	Piastrina di scarico Exhaust plate	Plaquette d'échappement Auslassplatte	Uitlaatplaatje Chapa de descarga
16	01827	N. 1	Chiusura convogliamento marmitta Muffler conveyance closure	Fermeture du convoyeur pot d'échappement Verschluss des Auspufftopf-Leitblechs	Afdekking geleider knaldemper Cierre transportador silenciador escape
17	01061	N. 1	Marmitta Muffler	Pot d'échappement Auspufftopf	Knaldemper Silenciador de escape
18	01178	N. 1	Fascetta Clamp	Collier Schelle	Bandje Abrazadera
19	02058	N. 2	Rondella piana Plain washer	Rondelle plate Flachscheibe e	Platte onderlegring Arandela plana
20	02057	N. 1	Rete metallica Wire netting	Grille métallique Metallgitter	Metalen rooster Red de alambre
21	01177	N. 1	Terminale di scarico Muffler end pipe	Partie terminale pot d'échappement Auspuff-Endrohr	Uiteinde uitlaat Tubo de descarga
22	01830	N. 1	Convogliatore marmitta Muffler conveyor	Convoyeur pot d'échappement Auspufftopf-Leitblech	Geleider knaldemper Transportador silenciador escape
23	02046	N. 1	Gommino protezione ponte di Diodi Diode bridge protection grommet	Protection en caoutchouc du pont de diodes Gummiteil zum Schutz der Diodenbrücke	Beschermrubbertje gelijkrichterbrug Proteccion de caucho puente de diodos
24	01251	N. 1	Diodo ponte raddrizzatore Bridge rectifier diode	Diode redresseur en pont Gleichrichterbrückendiode	Diode gelijkrichterbrug Diodo puente rectificador

Pos.	Code	Q.tà	Descrizione Description	Dèsignation Bezeichnung	Denomination Descripcion
25	01432	N. 1	Tappo olio Oil plug	Bouchon de l'huile Ölschraube	Oliedop Tapón aceite
26	00980	N. 1	Raccordo olio motore YAMAHA YAMAHA motor oil fitting	Raccord huile moteur YAMAHA Ölanschluss für YAMAHA-Motor	Oliekoppeling YAMAHA motor Empalme aceite motor YAMAHA
27	02115	N. 1	Guarnizione 14x20x1.5 ALLUMINIO Gasket 14x20x1.5 ALUMINUM	Joint 14x20x1.5 ALUMINIUM Dichtung 14x20x1.5 ALUMINIUM	Afdichting 14x20x1.5 ALUMINIUM Junta 14x20x1.5 ALUMINIO
28	01409	N. 1	Scatola filtro aria Air cleaner box	Boîtier du filtre à air Luftfiltergehäuse	Behuizing luchtfilter Caja filtro aire
29	02812	N. 1	Rete porta filtro Filter holding net	Filet porte-filtre Filtertragnetz	Filterhoudernet Red porta-filtro
30	02060	N. 1	Filtro aria Air cleaner	Filtre à air Luftfilter	Luchtfilter Filtro aire
31	02271	N. 1	Coperchio filtro aria Air cleaner lid	Couvercle du filtre à air Luftfilterdeckel	Kap luchfilter Tapa filtro aire
32	02743	N. 1	Candela Plug	Bougie Zündkerze	Bougie Bujía
33	01128	N. 1	Termostato 90° Thermostat 90°	Thermostat 90° Thermostat 90°	Thermostaat 90° Termostato 90°
34	02314	N. 1	Termostato 45° Thermostat 45°	Thermostat 45° Thermostat 45°	Thermostaat 45° Termostato 45°
35	01176	N. 1	Motore YAMAHA YAMAHA motor	Moteur YAMAHA Motor YAMAHA	YAMAHA motor Motor YAMAHA
36	03789	N. 1	Pannello di controllo ENERGY ENERGY control panel	Tableau/contrôle ENERGY Bedienpanel ENERGY	Schakelpaneel ENERGY Panel de control ENERGY
37	03796	N. 1	Cavo 5 m da generatore a Pannello di controllo 5 m cable from generating set to control panel	Câble 5 m du Générateur au Panneau de Contrôle 5 m Kabel von Generator zu Bedienpanel	5 m kabel van generator naar bedieningspaneel Cable 5 m de generador a panel de control
38	03797	N. 1	Cavo 7 m da generatore a Pannello di controllo 7 m cable from generating set to control panel	Câble 7 m du générateur au Panneau de Contrôle 7 m Kabel vom Generator zum Bedienpanel	7 m kabel van generator naar bedieningspaneel Cable 7 m de generador a panel de control
39	03798	N. 1	Cavo 10 m da generatore a Pannello di controllo 10 m cable from generating set to control panel	Câble 10 m du générateur au Panneau de Contrôle 10 m Kabel vom Generator zum Bedienpanel	10 m kabel van generator naar bedieningspaneel Cable 10 m de generador a panel de control
40	03799	N. 1	Cavo 15 m da generatore a Pannello di controllo 15 m cable from generating set to control panel	Câble 15 m du générateur au Panneau de contrôle 15 m Kabel vom Generator zum Bedienpanel	15 m kabel van generator naar bedieningspaneel Cable 15 m de generador a panel de control
41	01584	N. 1	Protezione termica Thermal protection	Protection thermique Thermoschutz	Thermische beveiliging Protección térmica
42	02688	N. 1	Fusibile 4 A 4 A fuse	Fusible 4 A 4 A Sicherung	Zekering 4 A Fusible 4 A
43	01607	N. 1	Fusibile 15 A 15 A fuse	Fusible 15 A 15 A Sicherung	Zekering 15 A Fusible 15 A
44	01605	N. 1	Potafusibile Fuse carrier	Tableau des fusibles Sicherungshalter	Zekeringhouder Portafusible

Pos.	Code	Q.tà	Descrizione Description	Dèsignation Bezeichnung	Denomination Descripcion
45	01603	N. 1	Piastra fissaggio Potafusibile Fastening plate for fuse carrier	Plaque de fixation tableau des fusibles Befestigungsplatte Sicherungshalter	Bevestigingsplaat zekeringhouder Placa fijación Portafusible
46	03854	N. 1	Scatola di Comando Control box	Boîtier de Commande Steuerbox	Besturingskast Caja de Mando
47	03779	N. 2	Morsetto Legrand 25 mm^2 Terminal Legrand 25 mm^2	Borne LEGRAND 25 mm^2 Klemme LEGRAND 25 mm^2	Aansluitklem LEGRAND 25 mm^2 Borne LEGRAND 25 mm^2
48	01139	N. 1	Morsetto Muller 3/12 Terminal Muller 3/12	Borne Muller 3/12 Klemme Muller 3/12	Aansluitklem Muller 3/12 Mordaza Muller 3/12
49	03440	N. 3	Distanziale Esagonale M3x8 Hexagonal M3x8 spacer	Entretoise Hexagonale M3x8 Distanzstück Sechskant M3x8	Zeskantafstandshouder M3x8 Separador Hexagonal M3x8
50	03853	N. 1	Fondo Scatola di Comando Control box bottom	Base Boîtier de Commande Boden der Steuerbox	Bodem besturingskast Fondo escala de Mando
51	04220	N. 1	Cablaggio con scheda elettronica Wiring with electronic board	Câblage avec carte électronique Verkabelung mit elektronischer Platine	Bedrading met elektronische kaart Cableado con tarjeta electrónica
52	00093	N. 1	Relè 12 V 70 A 12 V 70 A Relay	Relais 12 V 70 A Relais 12 V 70 A	Relais 12 V 70 A Rele 12 V 70 A
53	00478	N. 2	Raccordo 90°1/8 MF 1/8 MF union elbow	Raccord 90°1/8 MF Anschlussstuck 90°1/8 MF	Koppeling 90°1/8 MF Empalme 90°1/8 MF
54	00931	N. 2	Rondella in alluminio Aluminium washer	Rondelle en aluminium Alu-Scheibe	Onderlegring van aluminium Arandela aluminio
55	01936	N. 1	Prolunga Extension	Rallonge Verlängerung	Verlengstuk Extensión
56	00810	N. 1	Tappo Cap	Bouchon Kappe	Dop Tapón
57	02049	N. 1	Vite fissagio alternatore Alternator fastening screw	Vis de fixation de l'alternateur "Befestigungsschraube der Lichtmaschine"	Bevestigingsschroef dynamo Tornillo fijación alternador
58	01091	N. 4	Vite UNI 5931 UNI 5931 screw	Vis UNI 5931 Schraube UNI 5931	Schroef UNI 5931 Tornillo UNI 5931
59	03714	N. 1	FUSIONE 2501/A2 CASTING 2501/A2	MOULAGE 2501/A2 GUSSTEIL 2501/A2	GIETWERK 2501/A2 FUNDICION 2501/A2
60	02050	N. 1	Rondella alternatore Alternator washer	Rondelle de l'alternateur Scheibe der Lichtmaschine	Onderlegring dynamo Arandela alternador
61	02051	N. 1	Cuscinetto alternatore Alternator bearing	Palier de l'alternateur Lager der Lichtmaschine	Lager dynamo Cojinete alternador
62	03716	N. 1	Statore alternatore Alternator stator	Stator de l'alternateur Stator der Lichtmaschine	Stator dynamo Estator alternador
63	00299	N. 1	Motore EL. 12 V 0,30 kW El. Motor 12 V 0.30 kW	Moteur él. 12 V 0,30 kW Elektromotor 12 V 0,30 kW	El. motor 12 V 0,30 kW Motor el. 12 V 0,30 kW
64**	03717	N. 1	Rotore alternatore Alternator rotor	Rotor alternateur Rotor der Lichtmaschine	Rotor wisselstroomdynamo Rotor alternador
65	03729	N. 1	Flangia lavorata Machined flange	Bride usinée Bearbeiteter Flansch	Bewerkte flens Brida trabajada
66**	03727	N. 1	Corona dentata Ring gear	Couronne dentée Zahnkranz	Conisch tandwiel Corona dentada
67**	03728	N. 1	Mozzo flangiato Flanged hub	Moyeu bridée Flanschnabe	Geflensde naaf Cubo embridado
68	01023	N. 1	Ventola Fan	Ventilateur Lüfterrad	Ventilator Ventilador

Pos.	Code	Q.tà	Descrizione Description	Dèsignation Bezeichnung	Denomination Descripcion
69	01431	N. 1	Fusione ATR 2503/C1 Casting ATR 2503/C1	Moulage ATR 2503/C1 Gussteil ATR 2503/C1	Gietwerk ATR 2503/C1 Fusión ATR 2503/C1
70	01351	N. 1	Miscelatore Gigleur 2,7 Gicleur 2.7 mixer	Mélangeur Gigleur 2,7 Mischer Gigleur 2,7	Menger Gigleur 2,7 Mezclador Gigleur 2,7
71	03834	N. 1	Raccordo GAS a 90° GAS union elbow	Raccord GAZ à 90° GAS Anschluss 90°	GAS aansluiting 90° Conexión GAS a 90º
72	03855	N. 1	Tubo raccordo GAS GAS union pipe	Tuyau de raccord GAZ GAS Anschlussleitung	GAS aansluitpijp Tubo conexión GAS
73	03422	N. 1	Anello di serraggio Locking ring	Bague de serrage Arretierring	Klemring Anillo de apretado
74	03423	N. 1	Ghiera di serraggio Locking ring nut	Douille de serrage Befestigungsschraube	Klemmoer Virola de apretado
75	04042	N. 1	Raccordo uscita GAS GAS output fitting	Raccordo uscita GAS GAS output fitting	GAS uitlaatkoppeling Conexión salida GAS
76	00931	N. 1	Rondella in alluminio Aluminium washer	Rondelle en aluminium Alu-Scheibe	Onderlegring van aluminium Arandela aluminio
77	02292	N. 1	Bobina di starter Starter coil	Bobine d'allumage Starterspule	Starterspoel Bobina de starter
78	01349	N. 1	Riduttore Pressione GAS GAS pressure reducer	Manodétendeur GAZ GAS Druckreduzierer	GAS drukregelaar Reductor Presión GAS
79	01344	N. 1	Bobina GAS 12 V GAS 12 V coil	Bobine GAZ 12 V Spule GAS 12 V	Gasspoel 12 V Capuchón GAS 12 V
80	05570	N. 1	Raccordo ingresso GAS GAS input fitting	Raccord d'admission GAZ Anschlusss Eingang GAS	GAS inlaatkoppeling Conexión entrada GAS
81	04218	N. 1	Tappo Cap	Bouchon Kappe	Dop Tapón
82	04221	N. 1	Cavo raccordo GAS GAS fitting cable	Câble raccord GAS Verbindungskabel GAS	Verbindingskabel GAS Cable de empalme GAS

I	**	Pezzi assiemati e venduti in un unico Kit.
GB	**	Pieces assembled and sold in a single kit.
F	**	Pièces assemblées et vendues en un seul kit.
NL	**	Gemonteerde en in één set verkochte onderdelen.
E	**	Piezas unidas y vendidas en un kit único.
D	**	Zusammengesetzte Teile, die nicht einzeln, sondern nur als Kit erhältlich sind.

Notes

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